



Complete Summary

GUIDELINE TITLE

Obstructive voiding symptoms secondary to prostate disease.

BIBLIOGRAPHIC SOURCE(S)

Bluth EI, Francis IR, Baumgarten DA, Bush WH Jr, Casalino DD, Curry NS, Isreal GM, Jafri SZ, Kawashima A, Papanicolaou N, Remer EM, Sandler CM, Spring DB, Fulgham P, Expert Panel on Urologic Imaging. Obstructive voiding symptoms secondary to prostate disease. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 5 p. [28 references]

GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous published version: Bluth EI, Choyke PL, Bush WH Jr, Casalino DD, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Obstructive voiding symptoms secondary to prostate disease. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 4 p. [24 references]

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT
CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Obstructive voiding symptoms secondary to prostate disease

GUIDELINE CATEGORY

Evaluation
Screening

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Nephrology
Radiology
Urology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of radiologic examinations in investigating obstructive voiding symptoms secondary to prostate disease

TARGET POPULATION

Male patients with obstructive voiding symptoms secondary to prostate disease

INTERVENTIONS AND PRACTICES CONSIDERED

1. Ultrasound (US)
 - Bladder, transabdominal
 - Kidney, transabdominal
 - Prostate, transrectal
2. X-ray
 - Intravenous urography
 - Abdomen
 - Retrograde urethrogram
 - Invasive (INV) voiding cystourethrography (VCUG)
3. Magnetic resonance imaging (MRI), pelvis
4. Computed tomography (CT), abdomen and pelvis

MAJOR OUTCOMES CONSIDERED

Utility of radiologic procedures in the evaluation of obstructive voiding symptoms secondary to prostate disease

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed

by participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Obstructive Voiding Symptoms Secondary to Prostate Disease

Variant 1: Normal renal function.

Radiologic Procedure	Rating	Comments	RRL*
US bladder transabdominal	7	Post-void to measure residual urine. If there is significant residual, evaluation	None

Radiologic Procedure	Rating	Comments	RRL*
		of upper tracts is indicated. Gives estimate of prostate size. Resistive indices (RI) have been shown to be elevated in BPH and to decrease after transurethral vaporization of the prostate, suggesting that RI can be used to evaluate severity of BPH and monitor therapy.	
US kidney transabdominal	3	Appropriateness rating could be higher if significant residual urine were present. Evaluate for hydronephrosis.	None
X-ray intravenous urography	3	Appropriateness rating could be higher if significant residual urine is present. In patients with stones, hematuria, or atypical history, the study may be warranted. CT urography has replaced IVU in some centers.	Low
MRI pelvis	2		None
INV voiding cystourethrography	2	Consider in men younger than 50 with symptoms.	IP
X-ray abdomen	2	Other imaging studies more useful.	Low
US prostate transrectal	2		None
X-ray retrograde urethrogram	2	Does not assess prostate size.	Med
CT abdomen and pelvis	1	Not indicated.	High
<u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Increased blood urea nitrogen (BUN) and/or creatinine. (Refer to ACR Appropriateness Criteria® for Renal Failure. For example, in patients who have elevated renal function tests even after catheter drainage, renal scintigraphy should be considered.)

Radiologic Procedure	Rating	Comments	RRL*
US bladder transabdominal	8	To evaluate for residual urine and prostate size. Resistive indices (RI) have been shown to be elevated in BPH and to decrease after transurethral vaporization of the prostate, suggesting that RI can be used to evaluate severity of BPH and to monitor therapy.	None
US kidney transabdominal	8	To evaluate for hydronephrosis.	None
X-ray abdomen	3	To exclude calculi. Can be used in association with ultrasound.	Low
US prostate transrectal	2	Can assess prostate size by transabdominal ultrasound.	None
X-ray intravenous urography	2	Other studies better for evaluating same structures.	Low
X-ray retrograde urethrogram	2	Does not assess prostate size.	Med
MRI pelvis	2		None
INV voiding cystourethrography	2	Consider in men younger than 50 with symptoms.	IP
CT abdomen and pelvis	1	Not indicated.	High
<u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Obstructive voiding symptoms secondary to prostate disease include hesitancy, decreased force of stream, terminal dribbling, post-void fullness, and double voiding. Benign prostatic hypertrophy (BPH) is the most common cause of prostate enlargement requiring intervention. It is estimated that by 80 years of age, 75% of men have developed BPH. It has been hypothesized that age related impairment of blood supply to the lower urinary tract is important in the development of BPH. It has also been estimated that 10% of all males older than age 40 will have BPH requiring surgery before reaching age 80. Other causes of

bladder outlet obstruction include urethral stricture, prostate cancer, bladder neck contracture, and neurogenic disease.

Numerous imaging studies have been used in evaluating patients with symptoms of bladder outlet obstruction. These include plain films, intravenous pyelography (IVP), urethrography, both transabdominal and transrectal ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI). With the coming re-engineering of health care, selective use of these modalities will be required in order to decrease costs and practice efficient, effective medicine.

Plain-film radiography cannot be used to visualize the prostate directly. A distended bladder can be visualized as a pelvic mass, but unless information is available regarding when the patient last voided, this finding is of uncertain value. Prostatic calcifications can be visualized and always indicate glandular enlargement if they extend above the pubic symphysis. Bladder calculi can also be easily identified. In patients with prostate cancer and bone metastases, plain films are a valuable and inexpensive diagnostic tool. Eighty percent of bone metastases are osteoblastic, and mixed osteoblastic and osteolytic lesions are seen in another 15% of patients. However, bone scintigraphy is far more sensitive in identifying bone metastases at an early stage.

The routine use of IVP is not recommended. In patients who have stones on plain films, hematuria, or an atypical history, however, IVP may be warranted. There is no evidence that patients with BPH have a higher incidence of asymptomatic renal cancers than the general population in the same age group; therefore, an IVP to search for occult neoplasms is unwarranted. In a prospective study of 502 patients, the researchers found benign renal cysts in 10%, renal cancers in less than 1%, and significant upper urinary tract obstruction in 2.6%. When patients have obstructive symptoms and renal insufficiency, ultrasound (US) rather than IVP is recommended to evaluate for hydronephrosis. In patients with severe hydronephrosis, azotemia is almost always present, and US is indicated. In summary, while not routinely recommended, upper urinary tract imaging is indicated in patients with BPH and either hematuria (including asymptomatic microscopic), laboratory evidence of renal insufficiency, history of urinary tract infection, urolithiasis, previous urinary tract surgery, or congenital or acquired renal disease.

Retrograde urethrography is valuable to exclude urethral strictures but does not accurately assess the size of the prostate gland. As such, it is not part of the routine evaluation of patients with prostatism. Voiding cystourethrography should be considered only for men younger than age 50 with outflow obstruction symptoms.

Sonography can be used to evaluate the prostate transabdominally (through a distended bladder) or transrectally (TRUS). TRUS is preferred by urologists. The US pattern is still too nonspecific to differentiate benign from malignant prostate lesions. A particular problem is the difficulty in identifying isoechoic lesions. Recently the use of resistive index (RI) in prostate disease has been proposed as helpful. RI has been found to be elevated in the transition zone of patients with BPH, but not in the peripheral or central zones and not in normal patients or those with prostate cancer. RI has also been shown to decrease after transurethral vaporization of the prostate, suggesting that RI can be used to evaluate severity

of BPH and monitor the outcomes of therapy. TRUS is, however, used to guide lesion-directed and systematic biopsies of the prostate. It has been suggested that US contrast agents will make tumors more conspicuous, thus improving the detection rate of malignancy in contrast-enhanced targeted cases compared to sextant cases. Three-dimensional (3D) US may prove to be of value in the future.

Secondary changes of bladder outlet obstruction, such as bladder wall thickening, are better seen with US than IVP. The size of the enlarged prostate can be detected accurately by TRUS and MRI, but inaccuracies arise when using transabdominal US. TRUS and MR imaging have an advantage in that the internal prostatic anatomy is better seen and the ratio of glandular to stromal tissue in the prostate can be determined, although to date this information has not proven clinically useful. Identifying the size of the prostate is important since it helps determine the type of therapy indicated. Abdominal (suprapubic) US may be used to accurately (plus or minus 15%) measure residual urine volume in 90% of patients. However, catheterization is probably the least expensive method to accurately assess residual urine in the bladder.

In patients with azotemia, the collecting system of the kidneys should be imaged for dilatation. In patients with normal renal function, this may not be necessary. However, in a study of 128 patients, one group of researchers reported that hydronephrosis can be present with normal biochemical results.

The Clinical Practice Guideline of the Agency for Health Care Policy and Research (AHCPR) states that imaging of the upper urinary tracts by US or IVP is "not recommended unless patients have one or more of the following: hematuria, urinary tract infection, renal insufficiency (excluding IVP), history of urolithiasis, or history of urinary tract surgery".

CT has not proven to be of much value in evaluating the benign, enlarged prostate. There are reports of the value of MRI in evaluating the prostate gland. MRI is also useful in evaluating prostate size, although other less costly procedures, such as US, are preferred.

In summary, in patients who have normal renal function but suffer the symptoms of prostatism, a radiographic workup should be minimal. US is occasionally desirable for estimating prostate size prior to surgery. If azotemia is present, the upper urinary tracts should definitely be evaluated with US for the presence of hydronephrosis.

Abbreviations

- BPH, benign prostatic hypertrophy
- CT, computed tomography
- IP, in progress
- INV, invasive
- IVU, intravenous urography
- Med, medium
- MRI, magnetic resonance imaging
- RI, resistive index
- US, ultrasound

CLINICAL ALGORITHM(S)

None available

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures examinations to investigate obstructive voiding symptoms secondary to prostate disease

POTENTIAL HARMS

The relative radiation level is medium with X-ray retrograde urethrogram, and low with X-ray intravenous urography and X-ray of the abdomen.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Bluth EI, Francis IR, Baumgarten DA, Bush WH Jr, Casalino DD, Curry NS, Isreal GM, Jafri SZ, Kawashima A, Papanicolaou N, Remer EM, Sandler CM, Spring DB, Fulgham P, Expert Panel on Urologic Imaging. Obstructive voiding symptoms secondary to prostate disease. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 5 p. [28 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1995 (revised 2007)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Edward I. Bluth, MD; Isaac R. Francis, MD; Deborah A. Baumgarten, MD; William H. Bush, Jr., MD; David D. Casalino, MD; Nancy S. Curry, MD; Gary M. Israel, MD; S. Zafar H. Jafri, MD; Akira Kawashima, MD; Nicholas Papanicolaou, MD; Erick M. Remer, MD; Carl M. Sandler, MD; David B. Spring, MD; Pat Fulgham, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

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This is the current release of the guideline.

It updates a previous published version: Bluth EI, Choyke PL, Bush WH Jr, Casalino DD, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Obstructive voiding symptoms secondary to prostate disease. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 4 p. [24 references]

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GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).

ACR Appropriateness Criteria® *Anytime, Anywhere*™ (PDA application). Available from the [ACR Web site](#).

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).
- ACR Appropriateness Criteria®. Relative radiation level information. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in

Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001. This summary was updated by ECRI on September 8, 2004. The updated information was verified by the guideline developer on October 8, 2004. This summary was updated by ECRI on February 7, 2006. This NGC summary was updated by ECRI Institute on November 21, 2007.

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